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THOMAS A. GARDNER, Appellant, v. TEC SYSTEMS, INC., ET AL., Appellees

Appeal No. 83-697

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

725 F.2d 1338*; *1984 U.S. App. LEXIS 14829*; *220 U.S.P.Q. (BNA) 777

January 12, 1984

PRIOR HISTORY: [**1] Appealed from United States District Court for the Eastern District of Wisconsin.

DISPOSITION: Modified.

CASE SUMMARY:

PROCEDURAL POSTURE: Plaintiff appealed from a judgment of the United States District Court for the Eastern District of Wisconsin dismissing its complaint for patent infringement against defendants and holding four claims invalid for obviousness under *35 U.S.C.S. § 103*.

OVERVIEW: Plaintiff brought an action claiming defendants infringed plaintiff's patent on a device for drying ink. Defendants countered that the subject matter of the patent claims was obvious to a person skilled in the art, pursuant to *35 U.S.C.S. § 103*. Since a statutory presumption of validity existed in *35 U.S.C.S. § 282*, the burden was on defendants to prove sufficient facts to show that plaintiff's patented device was invalid. The court found that the trial court did not err in concluding that the dimensional limitations of plaintiff's patented device did not specify a device that performed and operated any differently from the prior art. The court upheld the finding that plaintiff's patent was invalid for obviousness under *§ 103*.

OUTCOME: The court affirmed the judgment dismissing plaintiff's complaint for patent infringement against defendants and holding four claims of plaintiff's patent were invalid for obviousness. The order was modified in that the court vacated a portion of the judgment to the extent that it purported to hold invalid any additional claims.

LexisNexis(R) Headnotes

Civil Procedure > Appeals > Standards of Review > De Novo Review
Patent Law > Jurisdiction & Review > Standards of Review > General Overview
Patent Law > Nonobviousness > Elements & Tests > General Overview
[HN1] A conclusion on obviousness is one of law and subject to full and independent review in the appeals court.

Patent Law > Nonobviousness > Elements & Tests > General Overview
[HN2] *35 U.S.C.S. § 103* makes the factual inquiry into the scope and content of the prior art the appropriate starting point for consideration of obviousness.

COUNSEL: Henry C. Fuller, Jr., of Milwaukee, Wisconsin, argued for Appellant.

James E. Nilles, of Milwaukee, Wisconsin, argued for Appellees.

JUDGES: Markey, Chief Judge, Friedman, Rich, Davis, Circuit Judges, Nichols, Senior Circuit Judge, * Baldwin, Kashiwa, Bennett, Miller, Smith, and Nies, Circuit Judges.

* Judge Nichols took senior status as of October 1, 1983.

OPINION BY: RICH

OPINION

[*1339] RICH, Circuit Judge.

Thomas A. Gardner appeals from the order and judgment of the United States District Court for the Eastern District of Wisconsin dismissing his complaint for patent infringement against appellees TEC Systems, Inc., et al. (TEC) and holding claims 1, 3, 4, and 8 [1] of his *U.S. patent No. 3,452,447* issued July 1, 1969 (the *'447 patent*), invalid for obviousness under *35 USC 103*. We affirm.

1 In the final "SUMMARY" section of its opinion, the trial court adjudged that "the patent in suit is invalid as obvious under *section 103*." Gardner cites this as error because only claims 1, 3, 4, and 8 were in suit. We agree. Reading the entire opinion makes it clear that the only claims which were tried by the parties and considered by the trial court were 1, 3, 4, and 8, and that the trial court simply misstated itself in the above-quoted statement. Accordingly, we regard the decision of the trial court as being limited, as it must be, to the claims in suit, and vacate the order of the trial court to the extent it purports to hold invalid any additional claims. *See Felburn v. New York Central R.R. Co., 350 F.2d 416, 420, 146 USPQ 622, 626 (6th Cir. 1965).*

[**2] [*1340] BACKGROUND

The Claimed Invention

The *'447 patent* describes and claims a device which is especially useful in drying the ink used on the high-gloss papers of which many periodicals are made. In the initial stages of the printing process, the paper is in the form of a continuous sheet called the "web." Upon leaving the printing press, the web bears ink which is still wet. Manipulation of the web thus must be accomplished without touching the web and smearing the wet ink. The device disclosed in the *'447 patent* supports and positions the web by floating it on one zone or between two opposed zones of static air under superatmospheric pressure. One embodiment of the invention is shown in Fig. 7 of the *'447 patent*, which is a fragmentary detail view in cross section, reproduced below (here and elsewhere extraneous numbers have been omitted for clarity):

[SEE ILLUSTRATION IN ORIGINAL]

With reference to the figure, web 30 is said to be positioned by the static superatmospheric pressure in zone 40. This zone is confined on the top by suppression plate 32, on the bottom by web 30, and on the sides by partially opposed jets 42 and 44. The structure shown [**3] in the figure would normally be duplicated in an inverted position below web 30. Web 30 is shown as moving from right to left. The structure shown in the figure is referred to by the parties as an "air bar." Gardner asserts that it prevents "fluttering" of the edges of the web, a problem which is said to have existed in prior art devices and to have caused marking of the web and smearing of the ink.

Claim 1, the only independent claim on appeal, in outline form reads as follows:

> 1. Means for positioning a moving web by subjecting a transverse zone spanning the web to uniform static pressure,
>
> said positioning means comprising
>
> a suppression plate
>
> extending transversely across said web and spaced therefrom as closely as is mechanically practicable,
>
> nozzle means no closer to the web than said plate and having slots which extend substantially continuously across said web and are spaced at opposite sides of said plate,
>
> the minimum spacing between the web and said plate being a distance at least approximately twice as great as the nozzle slot width,
>
> the maximum spacing of the plate from the web never being greater than the width of the plate
>
> the product [**4] of the width of the plate and the spacing of the plate from the web being less than twenty times the nozzle slot width,

> and means for discharging gas under pressure through the nozzle slots for defining a zone of static pressure between the plate and the web.

As will be developed below, the so-called dimensional limitations appearing in this [*1341] claim have taken on paramount significance. These limitations are expressed in terms of the distance between the suppression plate and the web (labelled "Y" in the specification), the nozzle slot width (also the orifice width, labelled "D" in the specification), and the width of the suppression plate, which corresponds to the distance between the jets (labelled "L" in the specification). Recasting the claim limitations using these labels, they are:

> (1) that Y be as small "as is mechanically practicable";
>
> (2) that Y be greater than or equal to 2D;
>
> (3) that Y never be greater than L; and
>
> (4) that the product LY be less than 20D.

The fourth limitation finds its basis in the specification in a discussion in which D is assigned a value of.030 inch and L a value of 2 inches. It is then stated [**5] that good results are achieved when Y is 3/16 inch (.1875 inch), but that performance falls off when Y exceeds.030 (sic,.3) inch. Inserting the values in (4), LY[max] =.6 in<2> and 20D =.6 in. It is apparently from this observation that Gardner derived his requirement that LY be less than 20D.

The Prior Art and Prosecution History

The prior art patent deemed most important by the trial court is *U.S. patent No. 3,181,250* to Vits (the Vits patent or Vits) entitled "Apparatus and Method of Drying Web Material by Directing Hollow Gas Jet Streams Against Opposite Faces of the Web." The general idea can be gleaned from the embodiment of the Vits dryer or air bar shown in his patent in Fig. 10, reproduced below:

[SEE ILLUSTRATION IN ORIGINAL]

In the figure, the solid lines show contours of Vits' postulated air flow. Arrows have been added to show the direction of air flow. The Vits dryer has a deflector 44 which extends the width of the web (web not shown). Bent-up edges 45 and 46 of deflector 44, together with nozzle head side walls 42 and 43, form slot nozzles 47 and 48. The air flowing from these nozzles forms, in the language of the Vits specification, "a flow-free [**6] prismatic space 53 in which a static excess pressure is built up * * *. In this manner, a beam-shaped cushion is formed having a triangular cross section * * *. Naturally, the crest edge of the cushion formed by the top of the triangle is hypothetical only, but the cushions of the drying medium, e.g., air cushions, flatten at their upper portions so that the web is supported over a relatively wide area." For a description of Vits in greater detail, see *In re Stroszynski, 57 C.C.P.A. 1037, 424 F.2d 1114, 1116, 165 USPQ 438, 439 (CCPA 1970).*

Vits was a major impediment to the ultimately successful prosecution of the applications which resulted in the *'447 patent*. As recounted by the trial judge, the initial application was filed on September 23, 1963; all claims corresponding to those involved herein were rejected on Vits. The claims were then amended, and again rejected on Vits. Gardner then filed, after final rejection, additional amendments and an affidavit presenting data from tests comparing his air bar with an air bar based on Fig. 10 of Vits, but differing from that shown in Fig. 10 in that it had narrower nozzles than shown therein. The purpose of this variation, [**7] as explained in the affidavit, was to make it possible to use comparable amounts of air in both devices. Gardner was attempting to show through the affidavit and the tests described therein that Vits depended on impingement or dynamic pressure, and did not teach or suggest the use of a zone of static pressure upon which Gardner's air bar depended. The examiner entered the affidavit, but nevertheless adhered to his rejection. Gardner then filed his first continuation application, the claims of which were also ultimately finally rejected [*1342] on Vits. Gardner then filed another amendment after final rejection, which the examiner refused to enter. The significance of this amendment and the refusal to enter it will be seen in connection with the next reference to be discussed. Gardner then filed a third continuation application, and amended the claims to their present form essentially by adding the dimensional limitations. The examiner again rejected the claims, but, after argument on behalf of Gardner, relented. The *'447 patent* issued July 1, 1969, after nearly six years of prosecution, the focus of which had been the patentability of the invention claimed therein over [**8] that disclosed by Vits.

Another prior art patent which the trial judge described as important is *U.S. patent No. 3,097,971* to Carlisle et al. (the Carlisle patent, or Carlisle). Entitled "Method of and Apparatus for Supporting or Guiding

Strip Material," it is concerned primarily with supporting materials such as steel strips, but expressly extends application of the principles taught therein to "wide elongate material of various kinds." Fig. 6 of Carlisle

[SEE ILLUSTRATION IN ORIGINAL]

shows diagrammatically the use of angled orifices which "enhances the cushion effect of the fluid." In short, Carlisle shows, as does Vits, the use of partially opposed jets to support a continuous sheet of material.

Carlisle was not cited by the examiner during prosecution of Gardner's initial application and two continuation applications. Gardner requested the examiner to make Carlisle of record in the remarks section of his amendment after final rejection in the first continuation application. It will be recalled, however, that the examiner in his discretion refused to enter that amendment. Thus, at trial, the parties contested whether Carlisle had been considered by the examiner at [**9] all, the significance they attached to this fact being, in the words of the trial court, whether the "patent in suit is not entitled to a presumption of validity as to Carlisle."

This last-quoted passage is especially significant in that it contains the trial court's only mention of the presumption of validity. Despite its awareness of controversy concerning the presumption, the trial court never concluded: (1) whether Carlisle had in fact been considered by the examiner; (2) whether Carlisle shows anything not shown in Vits, which was exhaustively considered by the examiner; (3) who had the burden of proving facts concerning validity or invalidity at trial; and (4) by what standard of proof those facts had to be shown.

The final prior art references deemed important by the trial court on the question of nonobviousness are two articles, both British. The first is unattributed and entitled "The Hover Pulley." It appeared in the January 1962 issue of *Metallurgia*. A "hover pulley" is described therein as means for supporting light gauge strip by use of a fluid cushion between the strip and guide surface, the fluid being introduced therebetween through a series of annular jets. [**10] The second article is entitled "The Support of Thin Steel Strip on Air Cushions." It was written by Jaffrey and Boxall, and was apparently first published in May 1963. As stated therein,

> The principle employed in the Hovercraft * * * is that a pressure rise occurs within the area enclosed by annular (slot) jets, if these jets are in close proximity to a surface (Fig. 3). Air issuing from the slot jets forms, in effect, a curtain which contains a cushion of air at a pressure greater than atmospheric. In our application of the principle, moving steel strip is supported on this cushion.

The Fig. 3 referred to in the above passage follows:

[*1343] [SEE ILLUSTRATION IN ORIGINAL]

While there is no dispute that neither of the two British articles was considered by the examiner, there is a dispute in this appeal over whether the Jaffrey and Boxall article is available as prior art. As Gardner points out, apparently for the first time on appeal, the article is not available under *35 USC § 102(b)* because its May 1963 publication date is not a full year before the September 1963 priority date of the *'447 patent*. TEC counters that it is available under *§* [**11] *102(a)* (as prior to Gardner's invention), to which Gardner responds that the trial court found that he had sold one of his air bars in April 1963, so that Jaffrey and Boxall is no more a reference under *§ 102(a)* than it was under *§ 102(b)*. The extent to which the trial court relied upon the Jaffrey and Boxall article in reaching its determination is unclear.

The four references just discussed -- Vits, Carlisle, and the two British articles -- are the only ones the trial court categorized as "important." There were two additional references -- *U.S. patent No. 3,041,739* to Meier-Windhorst and *reissue patent No. 24,144* to Dungler -- which it considered to be of "considerably lesser value." Neither patent seems to have had any detectable bearing on either the trial court's analysis or the arguments of the parties in this appeal. We will therefore not refer to them again.

The Trial Court

Briefly, the trial court recounted the '447 prosecution history, and opined that Gardner's variation of the nozzle width of his reconstruction of Vits used in tests comparing it with his own air bar rendered those tests "of little probative value." The trial court then essentially correctly [**12] laid out the tripartite test of nonobviousness as set forth by the Supreme Court in its application of *35 USC 103* in *Graham v. John Deere, 383 U.S. 1, 15 L. Ed. 2d 545, 86 S. Ct. 684 (1966)*. After turning to a description of the claimed subject matter, however, the trial court unfortunately and unnecessarily lapsed into enunciating what it apparently perceived to be an additional requirement for patentability:

> Thus, the claims represent a combination of old elements. To be patentable such a combination must produce a synergistic result, that is, produce a result greater than the sum of the parts. *Andersons-Black Rock v. Pavement* [sic; *Pave-*

ment Salvage] Co., 396 U.S. 57, 90 S. Ct. 305, 24 L. Ed. 2d 258 (1969).

Having lapsed, however, the trial court then returned to the proper course and undertook a complete tripartite analysis of obviousness. As to the level of skill in the art, the trial court found it to be that of a graduate engineer "with a number of years of experience visualizing, designing, fabricating and testing web handling and treating equipment."

As to the scope and content of the prior art, the trial court found that Vits was [**13] by far the most important reference, concluding:

> Thus it clearly appears that in 1961, Hilmar Vits was not only teaching the use of a cushion of excess static pressure to float a dry air cushion, but was also teaching that the zone of excess static pressure was occupied by a medium "entirely at rest." To the Court this sounds like exactly the concept that Gardner argued so vigorously to the examiner * * * that the zone [in his invention] was one in which there was "no flow of air through [*1344] or into or parallelling the zone of status [sic] pressure."

The trial court then read claim 1 of the *'447 patent* on the Vits dryer, finding in Vits every element recited in claim 1 except for the dimensional limitations, which the court viewed as "artificial dimensional limitations that add nothing to the claims, that are of no constructive significance, and are essentially meaningless." The trial court then went on to find that the additional limitations of dependent claims 3, 4, and 8 were all met by Vits and summed up by saying that the only actual difference between the claimed invention and Vits' dryer was that Vits' baffle plate 44 was not as close to the [**14] web as were the nozzles. The court said, however, that experiments conducted by TEC's expert, Dr. Daane, "demonstrated clearly that a Vits embodiment developed both static and kinetic energy, that there was no difference in the type of static pressure under the Vits or the Gardner teachings, and that the Vits device worked entirely satisfactorily in 'floating' a web."

After a brief and inconclusory discussion of the remaining references, the court concluded (finding numbers omitted):

> Having proceeded through the analysis required under *Graham v. John Deere Co., supra*, the Court expressly finds that the subject matter of the patent claims in issue would have been obvious to a person skilled in the art at the time the alleged invention was made.
>
> The Court further finds that the combination of old elements does not produce a synergistic result, *i.e.*, a greater result than the sum of the parts.
>
> Nor can the Court find any secondary factors such as long felt, unsolved needs, failure of others in the field, or commercial success to influence the determination of obviousness.

The court then denied TEC's request for attorney fees on the ground that this case is [**15] not extraordinary within the meaning of *35 USC 285*.

After trial, Gardner moved for additional discovery, a new trial, and for an order under *Fed. R. Civ. P. 59(e)* to alter or amend the judgment by adopting additional findings and conclusions regarding infringement, an issue the trial court had not reached due to its determination on validity. These motions were denied.

Gardner's Arguments on Appeal

Gardner contends that the trial court erred, inter alia, in: [2]

1) ignoring the statutory presumption of validity;

2) using the Jaffrey and Boxall article as prior art;

3) applying a test for obviousness "intertwined with elements of the requirements for synergism," or in holding synergism to be a requirement for patentability; and

4) refusing to credit Gardner's evidence of commercial success.

> 2 Gardner also alleges error in the trial court's disposition of matters pertaining to his assertion that the individual appellees here, who were defendants below, should have been found personally liable because TEC was merely their corporate alter ego. The trial court refused to credit this assertion, and so dismissed the suit as to them. The additional discovery Gardner sought was to help him to substantiate this claim. Gardner also moved to substitute W.R. Grace & Co. as a defendant as TEC's successor in interest. The trial court denied this motion as well. Due to our

disposition on validity, we have no occasion to pass on these matters.

[**16] OPINION

[HN1] A conclusion on obviousness is one of law and subject to full and independent review in this court. *Sarkisian v. Winn-Proof Corp., 688 F.2d 647, 651 (9th Cir. 1982)*. Our task is thus to consider the facts, either as properly found by the factfinder below or as stipulated to or otherwise uncontested by the parties, and reach our own conclusion on obviousness. We then either affirm the trial court if we agree with its conclusion, reverse if we do not, or vacate and remand for new or additional findings if, in our view, the record lacks facts essential to formulating a conclusion. [*1345] Affirmance does not require that we and the trial court reach the conclusion in precisely the same fashion. If, on the essential facts, arrived at through proper application of the relevant law, we agree with the trial court's conclusion, any error concerning nonessential facts ascribed to the trial court in reaching that conclusion is harmless and not a basis for reversal. *See 28 USC § 2111*.

35 USC § 103, as applied by the Supreme Court in *Graham v. John Deere*, [HN2] makes the factual inquiry into the scope and content of the prior art the appropriate starting point for [**17] consideration of obviousness. Thus, we start with the trial court's essentially unchallenged finding that Vits is unquestionably the most pertinent prior art. After painstaking review of the opinion of the trial court and the briefs on appeal, we have found neither a finding nor a contention which suggests that any of the remaining references teach anything not found in Vits. We therefore premise our reasoning, as did the trial court in essence, on Vits. Doing so obviates the need to consider Gardner's argument that the Jaffrey and Boxall article is not prior art, and whether Carlisle had been considered by the examiner.

We focus next on the differences between the claimed invention and the prior art. Again, we see no clear error in the trial court's finding that Vits discloses the invention of the claims in suit except for their dimensional limitations. TEC argues that these dimensional limitations are likewise met by Vits as well as by devices disclosed in other references, but points to no findings or evidence of record beyond the drawings in the references for support. The truth of the proposition is not self-evident. TEC's contentions in this regard are no more than [**18] unsupported argument of counsel, and for that reason unpersuasive. Differences between the prior art and the claimed invention therefore remain in the dimensional limitations recited in claim 1.

Finally, we expand our focus and ask the ultimate legal question whether these differences are such that the claimed invention *as a whole* would have been obvious to one of ordinary skill in the art at the time the invention was made. Recasting the question in terms of the specific facts of this case, we must decide whether an air bar which has dimensional proportions falling within the ranges recited in claim 1 would have been obvious. By virtue of the statutory presumption of validity, *35 USC 282*, it was up to TEC, the party asserting invalidity, to prove facts which would permit the trial court to answer this question in the affirmative.

It appears from the trial court's opinion, which is cast in the form of a short introduction and 102 "Findings of Fact" (which include some conclusions of law), that TEC tried to meet this burden by proving that the dimensional limitations do not aid in defining nonobvious subject matter because an air bar having relative dimensions falling within [**19] the specified proportional ranges performed no differently than an air bar constructed according to the teachings of Vits so that recitation of those limitations does not serve to distinguish over the prior art in any significant way. Whether meeting the dimensional limitations of claim 1 has no effect on air bar performance is, of course, a fact which TEC had the burden of proving. As for the standard of proof TEC had to meet to prove it, we note that the claims were allowed over Vits, and that no reference shows more than does Vits. It is thus perfectly clear that TEC in effect asked the trial court to cover precisely the same ground as that covered by the PTO in its quasi-judicial determination of patentability that it is authorized and required by statute to render. Therefore, TEC's burden on this point was a heavy one.

Bearing the foregoing in mind, we arrive at the nub of this case. If we are to agree with the trial court, we must have from it a finding supported by the record that TEC proved by clear and convincing evidence that a Gardner air bar coming within the claims of the *'447 patent* is not in any significant respect different from similar devices available in the [**20] prior art because structural differences over the prior art do [*1346] not necessarily result in differences in performance over the prior art. Since there is no express finding to this effect, we scrutinize the court's opinion to see whether we can infer such a finding from all that is said therein.

It is useful at this point to recapitulate in greater detail precisely what the trial court said about the dimensional limitations. As to the requirement that the suppression plate be as close to the web "as mechanically practicable," the trial court viewed it as a "limitation without a function." As to the remaining dimensional limitations, it said:

> The Court further concludes that the balance of the elements of plaintiff's Claim 1 represent limitations that do not

> really differentiate Gardner '447 from the Vits teachings and do not affect the utilization of the principles of fluid dynamics taught by Vits. * * * The Court views [these limitations] as artificial dimensional limitations that add nothing to the claims, that are of no constructive significance, and are essentially meaningless. The evidence at trial never showed that departing from these formulae would [**21] necessarily cause an air bar to function or fail. In other words, these claims [sic, claim limitations] are irrelevant.

Later in its opinion, the trial court repeated its position:

> All of the prior art air bars, despite different nozzle sizes, plenum pressures, nozzle directions, or other variations do, in the Court's view, depend upon the creation of a zone of superatmospheric pressure to support the web. Whether that support is weak or strong, uniform or variable, progressive or not, as well as the proportions of static pressure and kinetic pressure are matters which vary as these factors are manipulated. But they do not exhibit qualitatively different phenomena, all used static pressure to some degree; all have suppression plates or structures equivalent thereto; all have nozzle slots extending transversely of the web, and spaced on opposite sides of the suppression plate or similar structure. The dimensional limitations of Gardner's '447 are essentially meaningless.

Finally, in another opinion rendered a few months later disposing of several Gardner post-trial motions, the court made the following additional remarks:

> Having considered carefully [**22] all of the trial testimony and the numerous demonstrations and exhibits, the Court previously concluded that these requirements were empty formulae that had no relationship to any of the principles of fluid mechanics or phenomena thereof which were demonstrated in the trial. To this Court, they were incantations that may have superficially made the application sound like something unique and inventive but had no real function. So far as this poor observer could conclude, adherence to these dimensional mandates did not produce any discernible result or any synegistic [sic] effect. Nor did departure therefrom cause a failure of the web support. Surely, the patent law does not attach uniqueness to dimensional claims that have no significance in the operation of the claimed invention.

These extracts, and the opinion as a whole, lead us to conclude that the trial court was completely convinced that the dimensional limitations of claim 1 are no more than "window dressing," to use our own term. This conclusion is not based solely on the trial court's occasional and arguably fortuitous use of the word "clearly," although that is a valid consideration. Rather, it is based [**23] on everything the trial court said, and the emphatic and unambiguous manner in which it chose to say it. Although it never said so in precise terms, the trial court was unquestionably of the firm conviction that the proofs adduced at trial showed clearly and convincingly that the dimensional limitations of claim 1 failed to particularly point out a feature of an air bar which performed any differently from prior art bars, in other words, that those limitations are a verbal difference only. We thus proceed on the basis that the trial court, in essence, made an explicit finding to that effect.

[*1347] We next determine our standard of review of this inferred finding. Inasmuch as this finding is factual in nature, it would normally be reviewed under the "clearly erroneous" rule. *Fed. R. Civ. P. 52(a)*. Gardner argues, however, that the factual determinations in this case come within an exception to the clearly erroneous rule recognized in some courts when the trial court makes determinations solely on documentary evidence. Even if we recognize such an exception, it does not apply in this case. The opinion of the trial court, as well as the arguments of Gardner himself, make [**24] clear that resolution of this case turned at least partially on testimony given and exhibits displayed at trial. Accordingly, we apply the clearly erroneous standard. Was the trial court clearly erroneous in its conviction that the proofs adduced at trial showed clearly and convincingly that the dimensional limitations of claim 1 made no significant difference in the operation of an air bar?

The salient evidence introduced at trial consists of the following:

1. The tests described in Gardner's affidavit submitted to the PTO during prosecution of the applications leading to the *'447 patent*. As may be recalled, these tests used a version of the dryer shown in Fig. 10 of Vits except that the nozzle width was different. The tests produced the following graph, showing the pressure profile of a Gardner air bar versus that of the Gardner version of the Vits dryer, as reproduced in Gardner's brief:

[SEE ILLUSTRATION IN ORIGINAL]

This graph shows quite clearly that at least the Gardner version of the Vits dryer produced negative pressure or suction (below zero line) at the edge of the web, whereas the curve associated with Gardner's air bar shows positive pressure to the [**25] web's edge.

2. Tests described by Gardner in his testimony at trial, and also in Plaintiff's Exhibit (PX) 31. These tests also used a Gardner version of a Vits dryer in which the nozzle width differs from that shown in Fig. 10. PX31 contains graphs such as the following: [3]

[*1348] [SEE ILLUSTRATION IN ORIGINAL]

which confirm the findings set forth in the PTO affidavit that at least the Gardner embodiment of Vits which was used produced suction at the web edges.

3 This figure is a condensation of the exhibit, omitting one of two graphs.

3. The so-called "wooden block" tests conducted by TEC's expert, Dr. Daane. In these tests, Dr. Daane also used a Gardner version of Vits. He then inserted wooden blocks of various thicknesses between Vits' baffle and the web, filling up more or less of the space within the baffle, and measured the resultant pressure profiles. At trial, Gardner was also able to elicit from Dr. Daane additional testimony about the pressure at the web edges, which confirmed [**26] that a Gardner version of Vits produces suction there.

What little the trial court said about the evidentiary bases for its holdings has for the most part already been mentioned above. The trial court opined that the tests reported to the PTO were "of little probative value" because of Gardner's deviation from the nozzle width depicted in Fig. 10. The trial court said nothing about Gardner's PX31 tests and testimony, except for a catch-all statement that "The evidence at trial never showed that departing from [the dimensional limitations] would necessarily cause an air bar to function or fail." Finally, the trial court seemed to set great store by the evidence provided by Dr. Daane. As stated in its opinion (at finding 51):

> Dr. Daane conducted a series of experiments with a scaled model of a Vits bar (figure 10) using wooden inserts to vary the distance from the baffle plate to the surface of the web. These experiments, repeated during the trial, demonstrated clearly that a Vits embodiment developed both static and kinetic energy, that there was no difference in the type of static pressure under the Vits or the Gardner teachings, and that the Vits device worked entirely [**27] satisfactorily in "floating" a web. The pressure profiles differed somewhat depending on such factors as the pressure in the plenum (Sp.); the angle of [sic; at] which the jets struck the web; the size of the orifice and the relative closeness or remoteness [*1349] of the web to the suppression plate or baffle plate. However, the differences were in quantity, not kind, and might or might not be beneficial depending upon how important problems such as weight, strength, dryness, edge flutters, and support of the web were to one.

The trial court made additional relevant comments in the opinion on the denial of Gardner's post-trial motions:

> Tests done during trial of the bar embodying Gardner '447 claims and a bar embodying Vits claims convinced the Court that their performance was essentially the same -- and that they functioned under the same principles. This was particularly true when the tests utilizing a web and movable pressure gauge were performed by defendant with configurations, nozzle slots, and air pressures that made the tests probative. The wooden insert proved that for proper support, the nozzle slots did not have to be no closer to the web [**28] than the suppression plate; that the minimum spacing between the web and the plate did not have to be at least twice as great as the nozzle slot width; and that the product of the width of the plate and the spacing of the plate from the web did not have to necessarily be less than twenty times the nozzle slot width.
>
> As to the Gardner claim that the maximum spacing of the plate from the web could never be greater than the width of the plate, to be sure the Court observed

> that there was a limit beyond which the plate could not be separated from the web. Otherwise the phenomena which cause air bars to function became inoperable. But there was no magic to the various dimensional limitations which the applicant included in Claim 1 and, therefore, they provided no help to the Court in ruling on non-obviousness.

Gardner attacks the trial court's denigration of his affidavit tests by pointing out that Vits does not specify any width for his nozzles, and that the trial court could not properly rely upon the scale of Vits' Fig. 10 to infer the proper dimensions. The fact is that Gardner changed the Fig. 10 nozzle dimensions in building his version of Vits' bar and it was for [**29] the trial court to evaluate the probative weight to assign to the tests which were made with it. We cannot find reversible error in the trial court's evaluation of that test evidence on a fact issue.

Having surveyed all of the above-mentioned evidence, as well as other evidence cited to us by the parties, we are not "left with the definite and firm conviction that a mistake has been committed." *United States v. United States Gypsum Co., 333 U.S. 364, 395, 92 L. Ed. 746, 68 S. Ct. 525 (1948)*. It is indisputable from the record that a Gardner version of a Vits dryer produces some suction at the edge. It is equally indisputable, however, that pressure profiles are a complex function of nozzle size, nozzle direction, and plenum pressure, to name the few variables referred to by the trial court. Claim 1, however, is not limited to any of these variables. Thus, no unique pressure profile arises from the combination specified therein, and any advantage alleged to derive from the existence of such a pressure profile is eliminated from consideration. The trial court would not have been clearly erroneous in concluding that the dimensional limitations did not specify a device which [**30] performed and operated any differently from the prior art. Its decision therefore stands.

We note further that Gardner also alleges reversible error in the trial court's failure to find that Gardner's air bar had been a commercial success. Suffice it to say that this issue was hotly disputed at trial, with conflicting evidence on amounts of sales and whether those sales were due to the inclusion of the claimed features of the invention. TEC even goes so far as to say that Gardner's air bars were such a spectacular failure that they poisoned the reputation of floater dryers. The trial court resolved these issues of credibility by finding, in effect, neither commercial success nor failure. Gardner has failed to convince us of any clear error in its so doing.

Finally, to address Gardner's contentions regarding synergism, this court has [*1350] sought to make it clear that an absence of "synergism" or "synergistic effect" has no place in evaluating other evidence of nonobviousness, for example as in *Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d 1530, 1540, 218 USPQ 871, 880 (Fed. Cir. 1983)*. Here, however, as in *Stratoflex*, the trial court premised its holding of invalidity [**31] on proper grounds of obviousness, with which we agree, and at most alternatively on a lack of synergism. Thus, error in the trial court's reliance on a lack of synergism in this case is harmless. *Id.*

Gardner has not argued the validity of the remaining claims in suit, claims 3, 4, and 8, apart from the validity of claim 1, from which they depend. We cannot discern for ourselves any independent basis for their validity. We therefore affirm the holding of invalidity of these claims as well.

CONCLUSION

For the foregoing reasons, the decision of the trial court that *U.S. patent No. 3,452,447* is invalid is *vacated* as to claims 2, 5, 6, and 7 for reasons stated in note 1, supra, and *affirmed* as to claims 1, 3, 4, and 8.

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